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ABSTRACT

Primary and high school students (277 in grades 5-6; 615 in grades 7-12) in the United States (47 percent boys) responded to 26 items of the Facilitating Conditions Questionnaire (FCQ). Results indicate 7 distinct FCQ factors: perceived value of schooling; affect toward schooling; peer positive academic climate (Peer Positive); encouragement from parents (Parent Positive); encouragement from teachers; and pressure from peers (Peer Negative) and parents (Parents Negative). Peer-negative and parent-negative constructs were correlated positively with each other but negatively with all the positive constructs, providing support for convergent and discriminant validity. These factors were invariant across the primary and high school subsamples. Significantly weaker perceptions of facilitating conditions and strong perceptions of negative conditions found in high school students call for attention from educational practitioners and researchers. (Contains 5 pages of references.) (DFR)

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Facilitating Conditions For School Motivation

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Facilitating Conditions For School Motivation

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Paper presented at the International Congress for School Effectiveness and Improvement, 4-8 January 2000, Hong Kong.

Abstract

Primary and high school students (277 in Grades 5-6; 615 in Grades 7-12) in the U.S. (47% boys) responded to 26 items of the Facilitating Conditions Questionnaire (FCQ). Confirmatory factor analysis found 7 distinct FCQ factors: perceived value of schooling (Value), affect toward schooling (Affect), peer positive academic climate (Peer Positive), encouragement from parents (Parent Positive), encouragement from teacher (Teacher), and Pressure from peers (Peer Negative) and parents (Parent Negative). Peer and Parent Negative constructs were correlated positively with each other but negatively with all the positive constructs, providing support for convergent and discriminant validity. These factors were invariant across the primary and high school subsamples. Significantly weaker perceptions of facilitating conditions and stronger perceptions of negative conditions found in high school students call for attention from educational practitioners and researchers.

Recent research on school motivation has assumed that students' personal goal, expectancy and values tend to have considerable influence on their academic achievement and behaviors. McInerney (1988, 1989a, 1989b, 1991a, 1992), however, proposed that there are external forces in the school environment that may facilitate or inhibit the translation of motivational forces into actual behavior. To examine the potential impacts of these external environmental factors, McInerney designed a Facilitating Conditions Questionnaire (FCQ) based on Maehr's (1984) hypothesis of action possibilities (also see Maehr & Braskamp, 1986). Although the FCQ scales have been examined through exploratory factor analysis (McInerney, 1988, 1989a, 1989b, 1990) strong validation of the instrument requires a scrutiny of the relation of each factor with an external criterion variable such as academic achievement. The present study examines the construct validity of the FCQ instrument through a confirmatory factor analysis approach and to investigate the applicability of the FCQ scales to students in the primary and high schools. Based on the validated FCQ scales, we then compared these facilitating and inhibiting conditions for primary and high school students.

School Motivation and Facilitating Conditions

A number of theoretical perspectives have been used to investigate the relationship between motivation and school achievement. They include achievement goal theory (Ames, 1992; Anderman & Maehr, 1994; Blumenfeld, 1992; Pintrich, Marx, & Boyle, 1993; Urdan & Maehr, 1995), attribution theory (Weiner, 1984, 1986), and expectancy-value theory (Atkinson, 1964; Atkinson & Raynor, 1974; Eccles, 1983; Eccles & Wigfield, 1995; Wigfield, 1994). In general, correlational research has examined the strength of the relationships between various motivational scales and achievement outcome measures (e.g., Wentzel, 1993, 1998a). However, the relationship is never perfect. For example, in a series of studies McInerney (1990, 1991a, 1992, 1995; McInerney, Roche, McInerney, & Marsh, 1997; McInerney & Sinclair, 1991) found that reliable scales reflective of a range of potential motivators were significantly related to achievement outcomes and were able to explain variance in academic performance, school attendance, and intention to complete schooling for students from a range of cultural and social backgrounds. However, the amount of variance explained by a combination of motivational scales ranged from 40% to 75%. Perhaps the unexplained variance can be attributed to a range of other variables not measured that are equally, or more strongly, predictive of achievement.

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Consider situations where our strongly motivated intentions are never carried into action, while at other times we perform actions with very little premeditated intention. This situation is highlighted in studies by McInerney and associates (McInerney & McInerney, 1996; McInerney, McInerney, Bazeley, & Ardington, 1998; McInerney, McInerney, Ardington, & De Rachewiltz, 1997; McInerney & Swisher, 1995) which asked students from a wide range of cultural backgrounds their intentions for completing school and their occupational ambitions after leaving school. At a number of sites, retention levels and school success were found to be relatively low, and yet the motivation and intentions expressed by these students for completing school and progressing to college and high level careers were extremely high (see also Faltz, 1998). Although these students were expressing a strong motivation to complete school and to enhance their life opportunities, the chances of many of them doing so was far less optimistic. If there is little relationship between motivation and actual behavior, then the study of motivation benefits us little in the analysis of behavior. It is necessary, therefore, to examine, along with the potential motivators of behavior, those factors that might moderate the effect of the motivators.

What are the conditions that might lead to behavior different from what might be expected? Some motivational models such as personal investment theory (Maehr & Braskamp, 1986) and the social psychological theory of motivation developed by Triandis (1977, 1980) postulate an intervening construct which is hypothesized to be influential in determining whether motivated intention will be expressed as behavior. This construct, which we have labeled as facilitating conditions, comprises those background variables in the school environment that may facilitate or inhibit the performance of motivated behavior.

Operationalization of the Facilitating Conditions

Impacts of Significant Others

Significant others may facilitate or inhibit students' achievement motivation and behavior. There has been evidence of the importance of support from significant others in children's and adolescents' development of values and adjustments to new environments (e.g., Dunn, Putallaz, Sheppard, & Lindstrom, 1987; Mangione & Speth, 1998; Wolfendale, 1984; Zern, 1985). Among the significant others that have received attention are parents, teachers and peers. In particular, research has shown that there is a significant relationship of students' perception of support and caring from parents, teachers, and peers with aspects of motivation and academic achievement (Allocca & Muth, 1982; Bempechat, 1992; Connor, 1994; Elias, Ubriaco, Reese, & Gara, 1992; Ford & Harris, 1996; Harter, 1996; Jordan & Nettles, 1999; McInerney et al., 1997; Van Etten, Freebern, & Pressley, 1997; Walters & Bowen, 1997; Wentzel, 1998a, 1998b).

Parents. Perceived emotional and social support from parents has been related to perceived competence, good peer relationships, academic effort and interest in school (Allocca & Muth, 1982; Bempechat, 1990, 1992, 1998; Connell, Spencer, & Aber, 1994; Ford & Harris, 1996; Kerns, Klepac, & Cole, 1996; Kobak & Sceery, 1988; Wentzel, 1998a, 1998b). Scarr and Thompson (1994), for example, noted that children's academic and social competence may be predicted mainly by their family background, and that parents' psychological support in children's educational expectancy could be the most influential among all other sources of support (see also, Kerns, Klepac, & Cole, 1996; Kobak & Sceery, 1988).

Peers. Perceived emotional and social support from peers has been related to the pursuit of academic and prosocial goals, intrinsic value and self-concept (Allocca & Muth, 1982; Connor, 1994; Jordan & Nettles, 1999; Walters & Bowen, 1997; Wentzel, 1998a, 1998b; Wentzel & Caldwell, 1997; Wigfield, Eccles, & Rodriguez, 1998). From a developmental perspective, early adolescents' relations with peers provide them with experiences unique in shaping their personalities and beliefs. The time adolescents spend with peers is rivaled only perhaps by their parents (Hartup, 1983). As children grow older, the time they spend with peers increases and peer relations contribute dramatically to how adolescents think (Hartup & Sancilio, 1986; Rubin & Krasnor, 1985). It is not surprising that adolescents would share common interests and beliefs (Gottman, 1983); and peer support could have increasingly powerful influences as the adolescents grow up.

Teachers. Perceived support from teachers has been related to prosocial and responsible behavior, educational aspirations, intrinsic values, and enhanced self-concept (Goodenow, 1993; Goodenow & Grady, 1994; Harter, 1996; Wentzel, 1998a, 1998b; Wigfield, Eccles & Rodriguez, 1998). In the school setting, the teacher is probably one of the most salient sources of feedback for an adolescent's academic proficiency. Therefore, it would not be surprising that the teacher should be one of the most powerful sources of reinforcement in the formation of academic perceptions and development of academic behavior.

Whereas these supportive relationships with parents, teachers, and peers have been associated with academic success they appear to play relatively independent roles in students' lives, and their effects on motivational and academic outcomes appear to be primarily additive (Wentzel, 1998a, 1998b). Wentzel (1998a) found that support from parents was most clearly related to students' goal orientations, that from teachers was most clearly related to classroom functioning such as interest in class, adhering to class rules, and that from peers most related to prosocial behavior.

Affect Valuing School

Triandis' (1977, 1980) early conceptualization, motivated behavior is determined not only by students' conceptions of what is personally appropriate and what other people influence them to do, but also by how much they enjoy or dislike the behavior, what consequences are seen to be connected with the behavior, and how much these consequences are valued. In Maehr and Braskamp's (1986) conceptualization, affect and perceived value were also emphasized as moderating influences on the operation of personal incentives for engaging in motivated activity.

Affect to school. How much students like schooling is probably implicated in facilitating or inhibiting motivation. There has been considerable research linking affect to academic achievement in specific subject areas such as mathematics (McLeod, 1994; Middleton & Spanias, 1999; Turner, Thorpe, & Meyer, 1998; Ma, 1997), science (Koballa, 1995; Rennie & Punch, 1991) and language (Anderman, 1992; Dornyei, 1997; Gardner, Tremblay, & Masgoret, 1997). However, there is increasing concern among researchers that global affect must be considered an important factor influencing school achievement and be related to other motivational variables (Garcia, 1995; Gholar, 1991; Hektner & Czikszentmihalyi, 1996; Pajares, 1996; Pintrich, Marx, & Boyle, 1993; Seifert, 1997; Volet, 1997; Whitmore, 1986; Williams, 1997).

Perceived value of school. How much students value school for its instrumental worth may also facilitate or inhibit motivation to achieve. Expectancy value theory (Eccles, 1983; Wigfield, 1994; see also, Wigfield, Eccles, & Rodriguez, 1998) includes utility value as an important component of motivation. If students perceive that their life chances are not really enhanced through schooling they will probably be at risk for poor achievement, irrespective of their motivation. This, perhaps, addresses the paradox mentioned earlier. That is, while some students express strong motivation for schooling and value it, they perform poorly and engage in behavior which is counterproductive to achievement, such as high absenteeism (Faltz, 1998; see also Ogbu, 1983, 1992; Roeser & Eccles, 1998).

The Present Study

The purpose of the present study is to validate the FCQ using a methodology that allows a much stronger theory-based validation. An application of confirmatory factor analysis (CFA) not only enables a scrutiny of validity of the internal structure of the facilitating conditions constructs but also provides a strong validation approach by relating these constructs to external measures of academic achievement. Strong support for the validity of the FCQ constructs requires that (a) the respondents clearly distinguish between the constructs, (b) the CFA model testing the constructs fits the data, (c) the facilitating conditions correlate negatively with inhibiting factors, (d) the inhibiting factors correlate positively with each other, (e) the facilitating conditions correlate positively with academic outcomes, and (f) the inhibiting factors correlate negatively with the academic outcomes. Further support for the validity and applicability of the FCQ scales requires the invariance of the factors across multiple samples.

It is important that as students progress through school they develop positive attitudes towards the utility of school and positive perceptions regarding support from significant others if they are to

remain motivated at school. A further purpose of this paper is, therefore, to examine whether the positive facilitating conditions are stronger and the negative facilitating conditions weaker for the secondary students participating in the study.

Method

The FCQ Scales

The present study considered 26 of the 39 items in the original FCQ. A total of 13 items were discarded based on previous FCQ studies (McInerney, 1989a, 1991a, 1992) that have revealed weaknesses of such items in either low internal consistency or lack of multiple indicators in forming reliable scales. For all the items considered in the present study (see Appendix), a 5-point Likert-type scale was used (1 = strongly disagree to 5 = strongly agree). The items were coded such that the responses were positively correlated within each construct (see Appendix). Seven facilitating condition factors were posited. They were:

Value. Perceived value of schooling was inferred from four items coded such that higher scores reflected favorable values of schooling.

Affect. Four items inferred affect toward schooling. Higher scores reflected that the respondent likes school and finds interest in schooling.

Peer Positive. Peer positive academic climate was inferred from four items. Higher scores reflected a more desirable academic climate in the school.

Peer Negative. Peer negative academic climate was inferred from three items. Higher scores reflected less support from peers to study in the school.

Parent Positive. Parent positive academic climate was inferred from four items--two parallel items for Father and Mother, respectively. Higher scores reflected higher psychological support from parents.

Parent Negative. Parent negative academic climate was inferred from four items. Higher scores reflected less support from parents to study in the school.

Teacher. Three items were used to infer teacher positive academic climate. Higher scores reflected higher psychological support from teachers.

Grade Point Average (GPA)

Standardized achievement scores were available for the high school students (Grades 7 to 12). GPA was used as an external criterion measure for the validation of the FCQ scales. Strong validation of the FCQ scales requires positive correlations of GPA with the five positive FCQ scales (Value, Affect, Peer Positive, Parent Positive, and Teacher) and negative correlations with the two negative scales (Peer Negative and Parent Negative).

Participants

The students were from a school located in Phoenix, Arizona of the U.S.A. All the students in the present study were of Anglo background and spoke English as their first language. There were a total of 1,078 students (170, 154, 161, 151, 112, 125, 98, 107 respectively in Grades 5 to 12; 47% were boys). The survey was administered in intact classes by their teachers to students who had completed informed consent forms from themselves and their parents. Each item was read aloud in English while the students responded to it. The sample of students for the purpose of the present study after listwise deletion of missing data was 892 (277 in Grades 5 and 6, and 615 in Grades 7 to 12). The total sample was divided into these primary and high school groups to examine the applicability of the FCQ scales across the groups.

Statistical Analysis

Preliminary analysis included estimates of alpha reliability, scale means and standard deviations. Applying confirmatory factor analysis (CFA), we first tested the ability of each of the seven a priori factors to fit the data in a one-factor congeneric model which would also provide indication as to whether the uniquenesses of items (i.e., the item disturbance terms) should be correlated for a reasonable model fit. CFA was conducted with the SPSS versions of PRELIS and LISREL (Joreskog & Sorbom, 1989) based on listwise deletion for missing data. Procedures regarding the conduct of CFA is

available elsewhere and are not further detailed here (e.g., Bollen, 1989; Byrne, 1998; Joreskog & Sorbom, 1993; Pedhazur & Schmelkin, 1991). Following Marsh, Balla, and Hau (1996), and Marsh, Balla, and McDonald (1988), we emphasize the Tucker-Lewis index (TLI) to evaluate goodness of fit, but also present the χ^2 test statistic, and the relative noncentrality index (RNI). For an acceptable fit of a model to the data, typical guidelines are that TLI and RNI should be greater than .9. However, it is also important to compare the TLI values of competing models with the same data (McDonald & Marsh, 1990). In the present study, the 26 items forming 7 FCQ factors formed a 26 x 26 covariance matrix on which the CFA models were based. In the results, we present the models in two sections. The first section presents Models 1 to 7 (Table 1) using the whole sample. Model 8 added GPA as an external criterion measure to Model 2 positing seven FCQ factors. Because GPA was available only for the high school students, Model 8 involved only students from Grade 7 to Grade 12 (n = 604). In the second section, Models 9 to 14 tested the invariance of the FCQ factor structure across the primary and high school groups.

Table 1.
Goodness of Fit Summary of Measurement Models

Model	χ^2	df	TLI	RNI	Remark
1. 7 factors, no CU	3470.78	278	.651	.702	26 items form 7 factors
2. 7 factors, 7 CU	971.10	271	.922	.935	26 items form 7 factors
3. 1 factor, no CU	6442.08	299	.376	.426	26 items form 1 factor
4. 1 factor, 7 CU	2562.93	292	.764	.788	26 items form 1 factor
5. 6 factors, 7 CU	1066.84	277	.913	.926	5 positive + 1 negative factor
6. 6 factors, 7 CU	1399.82	277	.877	.895	1 factor for Value & Affect
7. 6 factors, 7 CU	1108.48	277	.909	.922	1 factor for Parent & Teacher
8. 7 factors, 7 CU, + GPA	773.28	290	.925	.938	GPA as external criterion
9. 2-group total invariant	1670.33	622	.900	.904	invariant FL, Corr, Uniq
10. 2-group invariant,FL,Corr	1488.75	589	.909	.918	invariant FL, Corr
11. 2-group invariant,FL,Uniq	1587.97	594	.901	.909	invariant FL, Uniq
12. 2-group invariant,FL	1411.46	561	.910	.922	invariant FL
13. 2-group noninvariant	1384.94	542	.908	.923	Parameters freely estimated
14. Latent mean structure	1471.53	580	.909	.919	Compare latent means

Note. N = 604 for Model 8. N = 892 for all other models. TLI = Tucker-Lewis index. RNI = Relative noncentrality index. Measurement models were tested with and without correlated uniquenesses (CU). The χ^2(df) value of the null model for Models 1 to 7 is 11033.39(325), that for Model 8 is 8115.03(351), and that for Models 9 to 14 is 11603.57(650). FL = factor loadings. Corr = Correlations among factors. Uniq = Uniquenesses of items.
* $p < .05$

Using the whole sample, Models 1 and 2 tested the ability of the a priori seven-factor structure to fit the data with or without correlated uniquenesses. The uniquenesses in Model 2 were based on the one-factor congeneric models tested separately for each construct, as described earlier. Parallel to Models 1 and 2, Models 3 and 4 were one-factor models with and without correlated uniquenesses. It was hypothesized that Models 1 and 2 positing multiple dimensions of facilitating conditions should fit better than Models 3 and 4, respectively. Model 5 tested whether the two negative factors (Parent Negative and Peer Negative) should form one instead of two factors. Similarly, Model 6 tested whether Value and Affect should form one instead of two factors and Model 7 tested whether the Parent Positive and Teacher factors should form a single factor. Support for the construct validity of a seven-factor FCQ structure would require (a) the seven-factor structure to fit the data better than other competing models (i.e., a higher TLI value compared to other models), (b) correlations among the factors to be low enough for the distinctiveness of constructs, (c) logically related factors to be more highly correlated with each other if both are positive or both are negative, (d) positive and negative factors to be negatively correlated, and (e) GPA to be positively correlated with the positive FCQ factors but negatively correlated with the negative FCQ factors.

Models 9 to 13 further examined the applicability of the seven FCQ factors and invariance of the factor structure across primary and high school subsamples. The primary school group comprised students in Grades 5 and 6 whereas the high school group comprised students from Grades 7 to 12. The multigroup CFA models considered the seven factor structure with both subsamples simultaneously. In

examining the invariance of the FCQ factors across the primary and high school groups, we tested a series of models imposing equality constraints across groups for the factor coefficients, the factor correlations, or the uniquenesses, or a combination of these parameter estimates. Thus Model 13 which allowed all the parameter estimates to vary across groups provided a baseline for comparison with the more parsimonious models (Models 9 to 12). Whereas the χ^2 value for the more parsimonious models (Models 9 to 12) cannot be better than a model with more estimated parameters (Model 13), the TLI value can be higher for more parsimonious models. Because each of Models 9 to 12 had equality constraints on the factor coefficients—which is a basic requirement for factor invariance across groups--to the extent that the TLI is as good in any of Models 9 to 12 as in the less restrictive Model 13, then there would be support for the more parsimonious model, and hence invariance of the FCQ factors across groups.

Finally, on the basis of factorial invariance such that the scale means in the primary and high school groups are comparable, Model 14 compared the means of the seven latent constructs across the two groups. We hypothesized that there would be significant differences between the primary and high school students in the seven factors.

Results

Preliminary Analysis

Alpha reliability estimates were good for the a priori scales (see Appendix). A one-factor congeneric model was tested separately with each scale to test its ability to fit the data with or without correlated uniquenesses for items that were highly associated. On the basis of these models, seven correlated uniquenesses were included in subsequent CFA models--1 for the Value construct, 2 for Parent Positive, 2 for Parent Negative, and 2 between the Parent Positive and Parent Negative constructs (see Appendix). Scale means and standard deviations for the constructs separately in the primary and high school groups were estimated using SPSS and are presented in Table 2 for ease of comparison between groups.

Convergent and Discriminant Validity of FCQ Scales

A summary of the models and their goodness of fit is presented in Table 1. A total of seven models tested the construct validity of the FCQ factors.

Model fit. We began with models testing our hypothesized seven-factor structure with and without correlated uniquenesses. Model 2 with seven correlated uniquenesses provided a much better fit than Model 1 without correlated uniquenesses (TLI values of .922 vs. .651). Parallel to Models 1 and 2, Models 3 and 4 provided a pair of competing models positing a single FCQ factor derived from the 26 items. Both Models 3 and 4 did not quite fit the data (TLI = .376 and .764, respectively). Model 5 testing the possibility of combining the Peer Negative and Parent Negative factors into a single construct provided a reasonable fit but did not fit as well as Model 2 (TLI values of .913 vs. .922). Similarly, Models 6 and 7 (TLI = .877 and .909, respectively) each positing six factors did not fit as well as Model 2.

Parameter estimates. Because the factor coefficient estimates and the pattern of factor correlations for Model 2 were similar to those for Model 14 (Table 2) discussed in the next section, the solution of Model 2 is not presented separately. An inspection of the parameter estimates in Table 2 found that the seven factors were well defined (factor coefficients ranging from .39 to .80). The factor correlations were either moderately positive or moderately negative. The highest correlation was between Peer Negative and Parent Negative (.82 and .84 respectively for primary and high school students), but Model 5 (Table 1) has shown that these two factors cannot be considered as one. The Value, Affect, Peer Positive, Parent Positive, and Teacher constructs were positively correlated. The negative factors (Peer Negative and Parent Negative) were positively correlated but were both negatively correlated with all the positive factors. Thus in support of the convergent and discriminant validity of the factor structure, (a) the seven-factor model provided a better fit than did other competing models, (b) the correlations among the factors were low enough for the constructs to be distinct, (c) all the positive factors were positively correlated and the negative factors were negatively correlated, and (d) all the positive factors were negatively correlated with the negative factors.

Table 2.

Solution of Model 14

Factor Coefficients (common across groups)							
Variable	Value	Affect	Peerpos	Peerneg	Parenpos	Parenneg	Teacher
Item 1	.39*	.61*	.60*	.80*	.69*	.58*	.67*
Item 2	.55*	.78*	.67*	.57*	.61*	.65*	.69*
Item 3	.77*	.73*	.50*	.77*	.67*	.59*	.71*
Item 4	.76*	.44*	.64*	--	.59*	.60*	--
Primary school subsample (n = 277)							
Mean	18.04	13.95	16.49	4.16	18.02	5.01	12.13
SD	2.20	3.45	2.57	1.64	2.48	1.92	2.42
Uniquenesses							
Item 1	.87*	.63*	.71*	.43*	.62*	.70*	.53*
Item 2	.76*	.40*	.68*	.68*	.62*	.70*	.63*
Item 3	.50*	.49*	.81*	.45*	.62*	.70*	.55*
Item 4	.44*	.77*	.65*	--	.63	.73*	--
Factor Correlations (Primary school subsample)							
Value	--						
Affect	.51*	--					
Peerpos	.55*	.64*	--				
Peerneg	-.39*	-.36*	-.74*	--			
Parenpos	.76*	.21*	.52*	-.39*	--		
Parenneg	-.50*	-.27*	-.64*	.82*	-.65*	--	
Teacher	.44*	.51*	.51*	-.49*	.51*	-.50*	--
High school subsample (n = 615)							
Mean	17.64	13.40	15.88	4.52	18.27	5.32	11.78
SD	2.58	3.39	3.04	1.89	2.55	2.14	2.49
Uniquenesses							
Item 1	.84*	.62*	.61*	.34*	.47*	.66*	.57*
Item 2	.67*	.39*	.49*	.68*	.62*	.53*	.47*
Item 3	.37*	.46*	.72*	.39*	.52*	.63*	.46*
Item 4	.42*	.82*	.58*	--	.66*	.59*	--
Factor Correlations (High school subsample)							
Value	--						
Affect	.52*	--					
Peerpos	.48*	.44*	--				
Peerneg	-.52*	-.31*	-.70*	--			
Parenpos	.46*	.37*	.45*	-.35*	--		
Parenneg	-.52*	-.18*	-.51*	.84*	-.53*	--	
Teacher	.46*	.55*	.54*	-.30*	.68*	-.36*	--
Kappa Values							
Eementary	0	0	0	0	0	0	0
High School	-.10*	-.12*	-.13*	.17*	.08	.09*	-.12*

Note: N = 892. Items for each factor are listed in Appendix. Parameter estimates are completely standardized. The 7 FCQ factors were Value, Affect, Peer Positive (Peerpos), Peer Negative (Peerneg), Parent Positive (Parenpos), Parent Negative (Parenneg), and Teacher. Factor coefficients are completely standardized in common metric whereas uniquenesses and factor correlations are standardized within each subsample. Scale means and SDs were estimated using the reliability procedures of SPSS. * $p < .05$.

Table 3.

Solution of Model 8

Factor Correlations								
Variable	Value	Affect	Peerpos	Peerneg	Parenpos	Parenneg	Teacher	GPA
Value	--							
Affect	.51*	--						
Peerpos	.48*	.44*	--					
Peerneg	-.52*	-.31*	-.70*	--				
Parenpos	.44*	.35*	.45*	-.36*	--			
Parenneg	-.51*	-.18*	-.50*	.83*	-.53*	--		
Teacher	.46*	.56*	.53*	-.29*	.68*	-.36*	--	
GPA	.26*	.31*	.41*	-.30*	.36*	-.22*	.49*	--

Note: N = 604, including only high school students. Items for each factor are listed in Appendix. Other parameter estimates are similar to those presented in Table 3. The 7 FCQ factors were Value, Affect, Peer Positive (Peerpos), Peer Negative (Peerneg), Parent Positive (Parenpos), Parent Negative (Parenneg), and Teacher. GPA = grade point average. * $p < .05$.

GPA as an external criterion. Model 8 included GPA as an external criterion variable for further scrutiny of the validity of the FCQ scales. Because the factor coefficients were similar to those presented

in Table 2, Table 3 presents only the factor correlations for the solution of Model 8. Similar to Model 2, all the five positive FCQ factors were positively correlated with each other whereas the two negative (Peer Negative and Parent Negative) FCQ factors were negatively correlated with all the five positive factors but positively correlated with each other. More importantly, the correlation between each of the five positive FCQ factors with GPA was significantly positive (.26, .31, .41, .36, and .49 respectively for Value, Affect, Peer Positive, Parent Positive, and Teacher) whereas the correlations between the negative FCQ factors and GPA were significantly negative (-.30 and -.22 respectively for Peer Negative and Parent Negative). These correlations provided further support for the convergent and discriminant validity of the positive and negative FCQ scales.

Applicability of the FCQ Across Primary and High School Subsamples

Model 13 which provided a basis for comparison with more restrictive models provided a good fit to the data (TLI = .908). A comparison of the fit of the multigroup CFA models (Models 9 to 13) found that Models 10 and 12 provided a comparable fit to Model 13 (TLI = .909 and .910, respectively vs. .908) whereas Models 9 and 11 did not fit as well (TLI = .900 and .901, respectively). These results suggest that the seven factors were comparable across the primary and high school groups. The invariance of the factor coefficients for all 26 FCQ items provided support for the applicability of the FCQ constructs in both primary and high school settings.

Comparison of Group Means

Support for the invariance of factor coefficients across groups also allowed us to compare the mean scores across groups. Instead of applying traditional analysis of variance procedures on scale means, we examined the latent mean structure of the FCQ factors. Using a CFA approach, we fixed the mean scores for the latent variables in the primary group to be zero and estimated how much the mean scores in the high school group differed from the zero means of the primary group (see Byrne, 1998). A positive estimate would show a higher mean score for the high school group whereas a negative estimate would mean a higher score for the primary. Model 14 testing the latent mean structure found statistically different mean scores in six of the seven factors (Table 2). High school students scored significantly lower in the Value, Affect, Peer Positive, and Teacher constructs but significantly higher in Peer Negative ($ps < .05$). There was no significant difference in the Parent Positive construct ($p > .05$).

Discussion

The present study examined the factor structure of the Facilitating Conditions Questionnaire (FCQ) using a large sample of primary and high school students in the U.S. The results support the seven-factor structure of the students' responses. First, the seven a priori factors were distinct from each other. Second, the five positive factors were positively correlated with each other. Third, the two negative factors were positively correlated with each other but negatively correlated with all the five positive factors. Fourth, the positive FCQ factors were positively correlated with standardized achievement scores whereas the negative FCQ factors were negatively correlated with these achievement scores. Extending previous factor analytic studies on the FCQ, the confirmatory factor analysis approach provided a much stronger validation of the FCQ constructs. By relating the FCQ constructs to an external criterion variable such as GPA, we were able to scrutinize the convergent and discriminant validity by examining the logical relation of each FCQ construct with the criterion variable. This strong validation approach has been demonstrated in numerous other studies (e.g., Byrne, 1984, 1996; Yeung & Lee, 1999), and should be recommended for validation studies in various areas.

The present study extends previous FCQ research based on exploratory factor analysis. We have demonstrated that the Facilitating Conditions Questionnaire (FCQ) is a valid measurement with both primary and secondary students. The FCQ provides, therefore, a valid instrument applicable for investigating the complex issue of possible forces that may facilitate or inhibit achievement behavior that has become a major concern of recent motivation research (see Pintrich, Marx, & Boyle, 1993; Urdan & Maehr, 1995; Van Etten, Pressley, Freebern, & Echevarria, 1998). It enables researchers to investigate the differential effects of internal motivators and external factors and their interactions. It

also provides a valid measure for testing hypotheses based on personal investment theory (Maehr & Braskamp, 1986) and social psychological theory of motivation (Triandis, 1977, 1980).

However, it is necessary to further validate the FCQ with other cultural and social groups to evaluate its applicability in a wider range of circumstances. In particular, it is necessary to examine if the FCQ is applicable across cultural groups as it might present an effective tool for exploring the reasons why some minorities and cultural groups do more poorly in school settings than others. Perhaps the reasons for the differential achievement between these groups lie with these external conditions, rather than with internal motivators. It is also possible that the facilitating conditions are more universal in their application and effects than motivational scales drawn from western theorizing.

Further research may also investigate the differential impacts of significant others on school motivation and academic achievement. Even though it may be reasonable to expect substantial impacts of significant others, unclear is, however, the relative strengths of these impacts on the adolescents' educational outcomes. The Parent, Teacher, and Peer scales allow researchers to examine which source of influence from significant others may substantially influence academic behavior and achievement, and what specific role each of these sources plays in shaping students' motivational orientations (see Wentzel, 1998a, 1998b). It is also important to examine how the functions of these influences from significant others change as children grow and progress through school (see Furnman & Buhrmester, 1992).

The differences found in the present study between primary and high school students in facilitating conditions are worrisome. We might anticipated that valuing school, liking school, and positive peer, teacher and parent effects should be higher for the secondary cohort, while negative peer and negative parent effects would be lower. Unfortunately, except for positive parent influence in which there were no differences, the exact opposite was the case. We interpret these results as indicating that whatever positive facilitating conditions are present in primary school tend to become weaker as students progress through school, while negative facilitating conditions become stronger. A limitation in this speculation is inferring findings in terms of developmental changes based on a cross-sectional sample. A stronger test of changes would require a longitudinal study following up the same cohort of students for a number of years. Nevertheless, the findings do have implications for schooling, at least to the extent that we need to examine whether this is in fact a developmental trend which is related to increasing school alienation by adolescents as they proceed through grades. This is particularly important if positive facilitating conditions are related to school achievement outcomes.

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Appendix

Variables in the Study and Alpha Reliability Estimates

Value α = .71
Item 1 [1] People who have a good schooling get more out of life than ones who don't.
Item 2 [1] If I do well at school I am more likely to get a good job.
Item 3 I think that it is really important to do well at school.
Item 4 Doing well at school is really important to my future.

Affect α = .73
Item 1 @ I hate learning or studying of anything.
Item 2 I like working at school.
Item 3 The subjects at school interest me.
Item 4 I don't mind working for long hours in schoolwork that interests me.

Peer Positive α = .68
Item 1 Most of my friends want to do well at school.
Item 2 Most of my friends want to go on to college.
Item 3 @ Education for most of us is a waste of time.
Item 4 @ Most of my friends want to leave school as soon as possible.

Peer Negative α = .74
Item 1 My friends say I should leave school as soon as possible.
Item 2 [6] My friends tell me to leave school and go on welfare.
Item 3 My friends tell me to leave school and get a job.

Parent Positive α = .82
Item 1 [2] My father thinks that I am bright enough to go on to college or university.
Item 2 [3] If I decided to go on to college or university my father would encourage me.
Item 3 [2] My mother thinks that I am bright enough to go on to college or university.
Item 4 [3] If I decided to go on to college or university my father would encourage me.

Parent Negative α = .82
Item 1 [4] My father encourages me to leave school as soon as possible.
Item 2 [5 6] My father thinks I should leave school as soon as possible to work.
Item 3 [4] My mother encourages me to leave school as soon as possible.
Item 4 [5 6] My mother thinks I should leave school as soon as possible to work.

Teacher α = .73
Item 1 I get encouragement from some of my teachers to do well at school.
Item 2 If I decided to go on to college or university teachers at this school would encourage me.
Item 3 Some of my teachers tell me I am bright enough to go on to college or university.

Note: @ Items reverse coded. Uniquenesses for items with the same superscript were correlated.